

File



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

| APPLICATION NO.                                          | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.           | CONFIRMATION NO. |
|----------------------------------------------------------|-------------|----------------------|-------------------------------|------------------|
| 10/644,324                                               | 08/20/2003  | Brian Johnson        | 2269-4196.1US<br>(99-0458.01) | 6644             |
| 24247                                                    | 7590        | 11/24/2004           | EXAMINER                      |                  |
| BRAGDON, REGINALD GLENWOOD                               |             |                      |                               |                  |
| TRASK BRITT<br>P.O. BOX 2550<br>SALT LAKE CITY, UT 84110 |             |                      | ART UNIT                      | PAPER NUMBER     |
|                                                          |             |                      | 2188                          |                  |

DATE MAILED: 11/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/644,324

Applicant(s)

JOHNSON, BRIAN

Examiner

Reginald G. Bragdon

Art Unit

2188

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 October 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 17-22 are objected to because of the following informalities:

As per claim 17, lines 6-7, “of the at least one memory command” should be deleted.

All dependent claims are objected to as having the same deficiencies as the claims they depend from.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-5, and 13-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As per claim 1, 13, 17, and 23, Applicant sets forth in the claims that the “data corresponding to the memory command arrives at the DRAM”, implying that the data does not travel through the FIFO. Applicant also sets forth “simultaneous reading and writing of the at least one of data and commands from the FIFO”, indicating that the data travels through the FIFO. It is not clear from the amended claim language whether the data travels through the FIFO or not. For purposes of applying the prior art, the Examiner will assume that the data travels through the FIFO.

All dependent claims are rejected as having the same deficiencies as the claims they depend from.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-4, 6, and 17-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Hang (5,487,049).

As per claim 1, Hang teaches, with respect to figure 1, a DRAM 16, a DRAM controller for controlling the DRAM (see column 4, line 30), and a FIFO 10 associated with the DRAM (see column 2, lines 60-63). Hang further teaches at column 3, lines 63-67, that the data register 30 and address register 34 are two-port memories which can simultaneously write data to a storage location having an address specified by a write count value while reading data from a different storage location having an address specified by a read count value. The claimed “control logic” is represented, at the least, by write counter 22, read counter 26, and state machine 20, as shown in figure 1. The FIFO temporarily stores addresses until a full page worth of data is stored in the data register for transfer to the DRAM. Hang sets forth that the address register FIFO 34 which holds 8 column addresses previously stored associated with data that is to be stored in the data register 30 and DRAM 16. See column 3, lines 62-67, and column 4, lines 26-29.

As per claim 2, Hang teaches a read counter 26 associated with the FIFO.

As per claim 3, Hang teaches that the read counter 26 is incremented upon a particular assertion of DRAMREQ. See column 4, lines 24-26. Therefore, prior to the read operation, the read counter register is configured to indicate the previous read counter setting.

As per claim 4, Hang teaches a write counter 22 associated with the FIFO.

As per claim 6, Hang teaches a FIFO system 10 including a FIFO data buffer 30 and address buffer 34, a write counter 22, and a read counter 26. See figure 1. Hang teaches that the read counter 26 is incremented upon a particular assertion of DRAMREQ. See column 4, lines 24-26. Therefore, prior to the read operation, the read counter register is configured to maintain the previous read counter setting. Hang sets forth that the address register FIFO 34 which holds 8 column addresses previously stored associated with data that is to be stored in the data register 30 and DRAM 16. See column 3, lines 62-67, and column 4, lines 26-29.

As per claim 17, Hang teaches, with respect to figure 1, a DRAM 16, a DRAM controller for controlling the DRAM (see column 4, line 30), and a FIFO 10 associated with the DRAM (see column 2, lines 60-63). A memory address is transmitted over address bus (ADRBUS) 12 (“receiving at least one memory bank address command bit”) and written to the address register 34 (“writing the at least one memory bank address command bit to the at least one FIFO buffer”). See column 3, lines 15-16, and column 4, lines 20-21. Data is received over DBUS 14 (“receiving data corresponding to the at least one memory bank address command bit at the control logic”). See column 4, lines 17-19. The memory bank address is read (“reading the memory bank address command”) and the associated data is then written to the DRAM (“storing the data...”). See column 4, lines 23-29. The FIFO temporarily stores addresses until a full page

Art Unit: 2188

worth of data is stored in the data register for transfer to the DRAM. Hang sets forth that the address register FIFO 34 which holds 8 column addresses previously stored associated with data that is to be stored in the data register 30 and DRAM 16. See column 3, lines 62-67, and column 4, lines 26-29.

As per claim 18, Hang teaches a write counter 22. A write pointer signal (“write latch signal”), WPTRN, is received by the write counter (“transmitting a first write latch signal...”), which causes the write counter to increment and point at another slot to be filled during a write operation (“adjusting the write counter...”). See column 3, lines 29-32.

As per claim 19, Hang teaches at column 4, lines 4-6, that WCNT increases in value from an initial value of 00. Therefore, the write counter is reset to a value of 00 prior to beginning the count.

As per claim 20, Hang teaches a FIFO buffer. Inherently a second memory bank address command will be received along with corresponding data, which will be read from the FIFO using the stored address for storage in the DRAM, in a manner similar to the first memory bank address command that is received.

As per claim 21, Hang teaches, with reference to figure 2, a plurality of sequential FIFO buffers, a write counter WCNT, and a read counter RCNT. The write counter is always maintained pointing ahead of the read counter. See figure 2 and column 4, lines 36-39.

As per claim 22, Hang teaches a write counter 22. A write pointer signal (“write latch signal”), WPTRN, is received by the write counter, which causes the write counter to increment and point at another slot to be filled during a write operation, prior to the read counter incrementing. See column 3, lines 29-32.

As per claim 23, Hang teaches a FIFO buffer having read counter 26 and write counter 22, which both initially point "00". A first data word is received and stored in the FIFO buffer. See column 4, lines 17-21. The write pointer is then incremented ("adjusting the write counter..."). See column 4, lines 4-6, and 17. The write counter is maintained pointing ahead of the read pointer. See column 4, lines 36-39. The FIFO temporarily stores addresses until a full page worth of data is stored in the data register for transfer to the DRAM. Hang sets forth that the address register FIFO 34 which holds 8 column addresses previously stored associated with data that is to be stored in the data register 30 and DRAM 16. See column 3, lines 62-67, and column 4, lines 26-29.

As per claim 24, Hang teaches reading the data from the FIFO buffer for storage in the DRAM as set forth in column 4, lines 23-29.

As per claim 25, Hang teaches a page in, burst-out FIFO buffer 10 (figure 1) that includes an address register 34 ("temporarily storing...address command) and a data register 30 ("receiving" and "storing" data). See in general figure 1. Hang teaches a FIFO buffer. Inherently a second memory bank address command will be received along with corresponding data, which will be read from the FIFO using the stored address for storage in the DRAM, in a manner similar to the first memory bank address command that is received. Hang sets forth that the address register FIFO 34 which holds 8 column addresses previously stored associated with data that is to be stored in the data register 30 and DRAM 16. See column 3, lines 62-67, and column 4, lines 26-29.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hang in view of Rust et al. (5,699,530).

As per claims 5 and 7, Hang does not teach that the counter registers are linear feedback shift registers. Rust et al. teaches that it was known to utilize linear feedback shift registers for read/write pointers in FIFO buffers. See the abstract at the bottom. It would have been obvious to one of ordinary skill in the art to have modified the counter registers of Hang to utilize linear feedback shift registers, as suggested by Rust et al., because Rust et al. teaches that linear feedback shift registers are advantageous in reducing the propagation time for selection signals traveling to an actual storage location. See column 3, lines 20-24.

8. Claims 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hang (5,487,049) in view of Thome et al. (5,289,584).

As per claims 8 and 10, Hang teaches a FIFO system 10 in a memory device including a FIFO data buffer 30 and address buffer 34, a write counter 22, and a read counter 26. See figure 1. Hang teaches that the read counter 26 is incremented upon a particular assertion of DRAMREQ. See column 4, lines 24-26. Therefore, prior to the read operation, the read counter register is configured to maintain the previous read counter setting. Hang sets forth that the address register FIFO 34 which holds 8 column addresses previously stored associated with data



Art Unit: 2188

that is to be stored in the data register 30 and DRAM 16. See column 3, lines 62-67, and column 4, lines 26-29.

Hang does not specifically mention a processor, input device (e.g. keyboard or mouse), output device (e.g. monitor), and a storage device (e.g. disk drive, tape drive). Thome et al. teaches a system including a page mode DRAM and a FIFO 114 or 116 (figure 2), which includes a CPU 30, keyboard 80 ("input device"), monitor 64 ("output device") and a hard disk 98 ("storage device"). See figure 1. It would have been obvious to one of ordinary skill in the art to have included a processor, input device, output device, and a storage device attached to the system bus disclosed at column 2, lines 50-51, because these elements are well known components of a computer system for the processing of data, storage of data and interaction with a user.

As per claim 9, Hang teaches that the memory device is a DRAM 16.

9. Claims 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hang (5,487,049) in view of Ichige et al. (5,426,612).

As per claims 11 and 12, Hang teaches the invention as set forth above for claim 6. However, Hang does not teach that the system is embodied on a semiconductor substrate (semiconductor wafer). Ichige et al. teaches that it was known in the art at the time the invention was made to incorporate a FIFO with associated pointer logic on a single semiconductor substrate/wafer. See figures 13-14, column 6 (lines 20-23), and column 22 (lines 37-45). It would have been obvious to one of ordinary skill in the art to have incorporated a FIFO with associated pointer logic on a single semiconductor substrate/wafer, as suggested by Ichige et al., because this simplifies production of the system, thereby saving cost, as well as reducing the

Art Unit: 2188

distance between functional elements, realizing an improvement in speed as well as a reduction in power.

10. Claims 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hang (5,487,049) in view of Wu et al. (6,329,997).

As per claims 13 and 16, Hang teaches the invention as set forth above for claim 1. However, Hang does not teach that the system is embodied on a semiconductor substrate (semiconductor wafer). Wu et al. teaches that it was known to incorporate a FIFO on the same substrate with a DRAM. See column 3, lines 8-20. It would have been obvious to one of ordinary skill in the art to have incorporated a FIFO with a DRAM on a single semiconductor substrate/wafer, as suggested by Wu et al., because this simplifies production of the system, thereby saving cost, as well as reducing the distance between functional elements, realizing an improvement in speed as well as a reduction in power.

As per claim 14, Hang teaches a read counter 26 associated with the FIFO.

As per claim 15, Hang teaches that the read counter 26 is incremented upon a particular assertion of DRAMREQ. See column 4, lines 24-26. Therefore, prior to the read operation, the read counter register is configured to maintain the previous read counter setting.

#### ***Terminal Disclaimer***

11. The terminal disclaimer filed on 12 October 2004 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of 6,732,223 has been reviewed and is accepted. The terminal disclaimer has been recorded.

***Response to Arguments***

12. Applicant's arguments filed 12 October 2004 have been fully considered but they are not persuasive.

With respect to Applicant's argument concerning the 35 U.S.C. 112, second paragraph, rejection of claims 1 and 13, this is not persuasive since Applicant merely repeats portions of the claim language without explaining how the claim language is not indefinite.

With respect to Applicant's arguments concerning the 35 U.S.C. 112, second paragraph, rejection of claims 17 and 23, these are not persuasive since the rejection was not based on the storage of a "command" in the FIFO (the storage of commands in the FIFO is not unclear in the claim language). What was set forth as being unclear was the traversal of "data" through the FIFO. It is not clearly set forth in the claims that data travels through the FIFO as well as commands.

With respect to Applicant's arguments concerning the rejection of the claims under 35 U.S.C. 102(b) as being anticipated by Hang, these are not persuasive. Applicant argues that Hang is not configured for storing at least one memory command (which includes at least an address). However, Hang sets forth the address register FIFO 34 which holds 8 column addresses previously stored associated with data that is to be stored in the data register 30 and DRAM 16. See column 3, lines 62-67, and column 4, lines 26-29.

With respect to Applicant's arguments concerning the rejection of the claims 5, 7-10, and 13-16 under 35 U.S.C. 103, Applicant merely reiterates that Hang does not teach storing an address command in the FIFO. However, this is taught by Hang as set forth in the rejection and the response to arguments for the rejection of the claims under 35 U.S.C. 102(b), above.

Art Unit: 2188

With respect to Applicant's arguments concerning the rejection of claims 11-12 under 35 U.S.C. 103, Applicant argues that Hang does not teach or suggest "at least one pointer register configured to maintain a previous read counter setting of the at least one read counter". However, the Examiner maintains that Hang teaches that the read counter 26 is incremented upon a particular assertion of DRAMREQ (see column 4, lines 24-26) and therefore, prior to the read operation, the read counter register is configured to maintain the previous read counter setting.

### ***Conclusion***

13. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

14. Any response to this final action should be mailed to:

Box AF

Commissioner of Patents and Trademarks  
Washington, D.C. 20231

Art Unit: 2188

All "OFFICIAL" patent application related correspondence transmitted by FAX must be directed to the central FAX number at **(703) 872-9306**:

"INFORMAL" or "DRAFT" FAX communications may be sent to the Examiner at **(571) 273-4204**, only after approval by the Examiner.

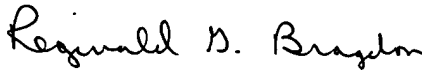
Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA., Fourth Floor (receptionist).

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Reginald G. Bragdon whose telephone number is (571) 272-4204. The examiner can normally be reached on Monday-Thursday from 7:00 AM to 4:30 PM and every other Friday from 7:00 AM to 3:30 PM.

The examiner's supervisor, Mano Padmanabhan, can be reached at (571) 272-4210.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-3900.

RGB  
November 22, 2004

  
Reginald G. Bragdon  
Primary Patent Examiner  
Art Unit 2188